

Wind Electricity



Probably one of the first renewable energy sources to be harnessed by humans, wind has been a productive part of life as far back as recorded history. Over the centuries, wind has been used to power ships, mill grain, and pump water. In recent decades, we've developed ways to convert wind energy into a clean, limitless source of electricity to power our homes and businesses.



CALIFORNIA ENERGY COMMISSION

The power of wind



What is wind electricity?

Wind, a form of solar energy, is the atmosphere's response to air masses heated unevenly by the sun. These conditions create regional atmospheric pressure differences, causing wind to blow from areas of high pressure to low pressure. The larger the differences in pressure, the greater the wind velocity.

We use wind turbines to turn the wind's energy into electricity. The blade, or floater, of a wind turbine is very similar in design to an airplane wing. Its shape is very efficient in converting the wind's force into rotational energy, causing the blade to spin. The blade is connected to a shaft that, in turn, is connected to an electrical generator. There is very little energy available in light breezes; conversely, high winds contain an overabundance of available energy. Turbulence, obstructions and sheltering all reduce the performance of wind turbines. Cold air is denser than hot air, meaning wind turbines can generate about five percent more power in the winter than in the summer.

Modern wind turbines are available in sizes to meet the smaller electrical needs of homes, businesses, farms and ranches, or the larger demands of utility-scale power plants. Smaller wind systems, generally sized under ten kilowatts in capacity, work best in an average wind speed of ten miles-per-hour. These systems are typically installed on towers 60 to 100 feet tall and produce some or all of the electricity needs of the site.

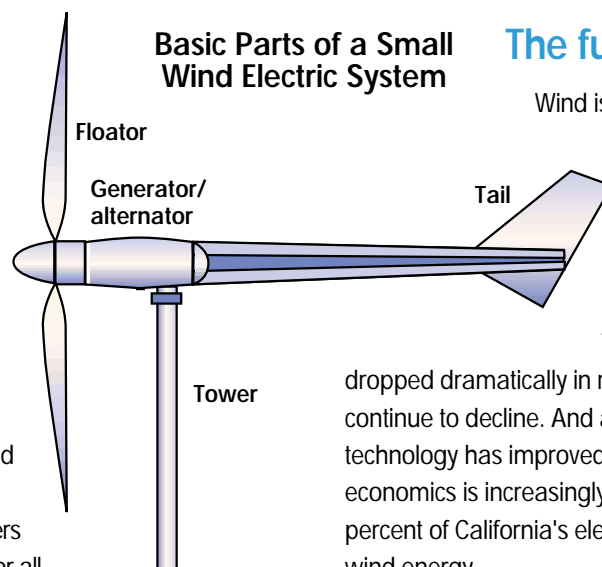
Because the ground reduces wind speed, stronger winds are found higher above the earth. Where wind speeds are at least 17 miles-per-hour, wind turbines operate more efficiently. Large wind turbines can be as tall as 200 feet, and produce 500 kilowatts or more. These utility-scale wind turbines are often installed in clusters and located on hilltops, mountains, or passes.

Why is wind electricity important?

Wind electricity is affordable, environmentally-friendly and sustainable. Unlike conventional electricity production, wind electricity releases no air pollutants or greenhouse gases, and is an inexhaustible energy source.

Installing a small wind turbine at a home or business offsets electricity purchased from a utility and reduces electricity bills. Utility-scale wind farms with modern, state-of-the-art turbines offer wind electricity at prices that are nearly competitive with conventional electricity.

The wind energy industry is a growing source of manufacturing jobs, helping local economies and reducing our dependence on fuel imports. Increasing our use of local energy resources helps stabilize energy supplies and lowers the risk of electricity price spikes.



The future of wind electricity

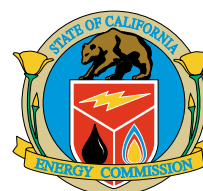
Wind is becoming a highly utilized and fast-growing energy source. Residents worldwide are installing small wind turbines to generate their own reliable electricity using the clean, renewable energy of the wind.

The cost of wind electricity has dropped dramatically in recent decades, and is expected to continue to decline. And as costs have decreased, wind energy technology has improved tremendously. Wind power's economics is increasingly attractive to utilities, with over one percent of California's electricity currently being generated by wind energy.

Wind turbines have relatively low initial costs, produce no air emissions, and require only the wind as fuel, making large and small wind electricity generating systems attractive alternatives to conventional electricity generation. Affordable to operate and a clean source of energy, wind power is an economically viable source of electricity for powering homes, businesses, and our state's utility grid today and in the future.

Harness the Power All Around Us

For more information on wind electricity and other renewable energy sources
www.consumerenergycenter.org



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